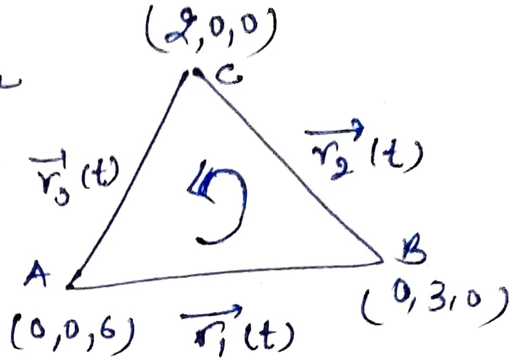
$$\int (x+2y)\,dx + (x-2)\,dy + (y-z)\,dz$$

First we peromaterized the Curve.



$\vec{r_1}(t) = A + t(B-A)$

$\vec{r_1} = \langle 0,0,6\rangle + t\langle 0,3,-6\rangle$

$\vec{r_1}(t) = \langle 0, 3t, 6-6t\rangle$

$x(t) = 0$
$y(t) = 3t$
$z(t) = 6-6t$

if $t=0$ then $\vec{r_1}(t) = \langle 0,0,6\rangle$ A

if $t=1$ then $\vec{r_1}(t) = \langle 0,3,0\rangle$ B

similary $\vec{r_2}(t) = B + t(C-B)$

$= \langle 0,3,0\rangle + t\langle -2,3,0\rangle$

$= \langle -2t, 3-3t, 0\rangle$

and $t=0 \to B$

$t=1 \to C$

and $\vec{r_3}(t) = \langle 2+2t, 0, -6t\rangle$

$t=0$ to $t=-1$

Here $\int_C (x+2y)\,dx + (x-2)\,dy + (y-z)\,dz =$

$$\int_{\vec{r_1}(t)} (0-2)\cdot 3dt + (3t-6+6t)(-6dt) +$$

$$\int_{r_2(t)} [-2t + 2(3-3t)](-2dt) + (-2t-2)(-3dt) +$$

$$\int_{r_3'(t)} (\cancel{t}) \cdot (2+2t) \cdot 2dt + (6t) \cdot 6\,dt$$

$$= \int_0^1 -\cancel{12}dt +$$

$$\int_0^1 [-6 + 18t + 36 - 36t]\,dt + \int_0^1 (4t - 12 + 12t)\,dt$$

$$+ \int_0^{-1} [4 + 4t + 36t]\,dt$$

$$= \int_0^1 (30 - 54t) + 4t + 12t - 12)\,dt + \int_0^{-1} (4 + 40t)\,dt$$

$$\int_0^1 (18 - 38t)\,dt + \int_0^{-1} (4 + 40t)\,dt$$

$$\left[18t - \frac{38t^2}{2}\right]_0^1 + \left[4t + \frac{40t^2}{2}\right]_0^{-1}$$

$$[18 - 19] + [4 + 20]$$

$$-1 + 24$$

23 Ans.